PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:	DAVID A. PALSULICH ET AL.	EXAMINER:	MAHMOUD DAHIMENE
APPLICATION NO.:	10/636,021	ART UNIT:	1792
FILED:	AUGUST 6, 2003	CONF. NO:	1017
FOR:	**MICROFEATURE WORKPIECE PROCESSING SYSTEM FOR, E.G., SEMICONDUCTOR WAFER ANALYSIS**		

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This brief is filed within five months from the November 2, 2007 mailing date of the Notice of Panel Decision from Pre-Appeal Brief Review, and is in furtherance of the Notice of Appeal filed January 17, 2007.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Micron Technology, Inc.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 36 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 29-48
2. Claims withdrawn from consideration but not canceled: none
3. Claims pending: 1-28 and 49-56
4. Claims allowed: none
5. Claims rejected: 1-28 and 49-56

C. Claims On Appeal

The claims on appeal are claims 1-28 and 49-56.

IV. STATUS OF AMENDMENTS

Applicant did not file an Amendment After Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Etching is a technique often used in semiconductor manufacturing to selectively remove material from a surface of a workpiece. (*See e.g.*, Specification, 1:15-17) There are generally two types of etching processes – "dry" etching and "wet" etching. (*See e.g.*, Specification, 1:17-19) Most dry etching operations are carried out using a high-energy plasma in the vapor phase. (*See e.g.*, Specification, 1:19-21) Wet etching processes are generally conducted in a tank that contains an etchant liquid. (*See e.g.*, Specification, 1:21-23)

Figure 2 (reproduced below) schematically illustrates a conventional wet etching system 50. As shown in Figure 2, a microfeature workpiece W is positioned in the interior of a tank 52 and immersed in an etching liquid 54. (*See e.g.*, Specification, 2:21-23)

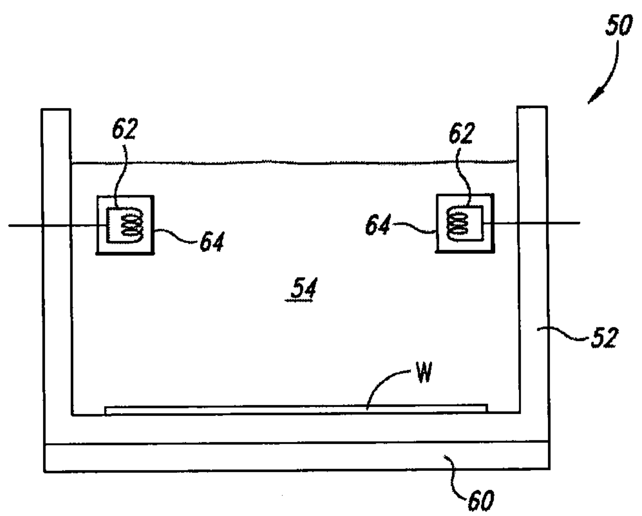


Fig. 2
(Prior Art)

To heat the microfeature workpiece W, the wet etching system 50 may have an external conduction heater 60 that can conduct heat through the wall of the vessel 52 and one or more internal heating elements 62. (*See e.g.*, Specification, 2:28-30)

The heating arrangement illustrated in Figure 2 may have several drawbacks. For example, the external conduction heater 60 can significantly restrict the choice of materials for forming the tank 52 because the tank 52 must be able to withstand elevated temperatures. (*See e.g.*, Specification, 3:5-7) As a result, the tank 52 is typically formed of a high temperature material, e.g., quartz. (*See e.g.*, Specification, 4:3-5) However, highly pure quartz tanks sufficiently large to handle 300 mm-diameter wafers are difficult and expensive to manufacture. (*See e.g.*, Specification, 4:6-8) In addition, hydrofluoric acid, a common semiconductor etchant, generally can not be used in a quartz vessel because hydrofluoric acid may react with quartz. (*See e.g.*, Specification, 4:9-11)

Another drawback is that the internal heating elements 62 may increase the risk of contaminating the etching liquid 54. (*See e.g.*, Specification, 3:9-11) To limit the risk of contamination, internal heating elements 62 are typically coated with a material that is substantially non-reactive with the etching liquid 54. (*See e.g.*, Specification, 3:11-13) However, any defects in the coating may allow the heating elements 62 to contaminate the etching liquid 54. (*See e.g.*, Specification, 3:13-16) In addition, the internal heating elements 62 typically require an electrical or other connection through the wall of the tank 52. (*See e.g.*, Specification, 3:16-18) Seals may be formed around these connections to limit any leakage or contamination of the etching liquid 54, but such seals are subject to degradation and present another maintenance requirement and potential point of failure. (*See e.g.*, Specification, 3:18-20)

A. <u>Claim 1</u>

Several embodiments of the present invention resolve the above-described drawbacks by constructing a wall of a processing chamber with a polymeric material that is substantially transparent to radiation from a radiation source positioned outside the processing chamber. (*See e.g.*, Specification, 8:2-10 and 11:17-27) For example, one embodiment of a method of processing a microfeature workpiece includes supporting the microfeature workpiece by an unheated support in the interior of the processing chamber having the polymeric wall. (*See e.g.*, Specification, 9:13-15) A surface of the microfeature workpiece is in contact with the etchant liquid. (*See e.g.*, Specification, 8:8-10) The radiation source then delivers radiation to the etchant liquid through the

polymeric wall of the processing chamber. Because the polymeric wall is substantially transparent to the radiation, a temperature of the etchant liquid increases faster than a temperature of the polymeric wall. (*See e.g.*, Specification, 17:13-15) After a target temperature is reached, the radiation source can be controlled to maintain the temperature of the etchant liquid at or above the target temperature to etch the surface of the microfeature workpiece. (*See e.g.*, Specification, 17:4-9) Afterwards, the etched microfeature workpiece is removed from the processing chamber. (*See e.g.*, Specification, 4:1-3)

B. Claim 11

In another embodiment, as set forth in claim 11, a method of processing a microfeature workpiece includes positioning a microfeature workpiece on an unheated support in an interior of a processing chamber that has a polymeric wall with an inner surface. (*See e.g.*, Specification, 11:17-27) The microfeature workpiece is enclosed within the interior of the processing chamber. *Id.* A surface of the microfeature workpiece is in contact with an etchant liquid at a first temperature, and the etchant liquid is substantially non-reactive with the inner surface of the processing chamber. (*See e.g.*, Specification, 8:8-10) The etchant liquid is heated from the first temperature to a second temperature using an infrared heat source positioned entirely outside the enclosed processing chamber and through the polymeric wall. The second temperature is higher than the first temperature, and the second temperature promotes etching of a surface of the microfeature workpiece. (*See e.g.*, Specification, 6:13-17) Because the etchant liquid is more absorptive of radiation from the infrared heat source than the polymeric wall, the etchant liquid is heated more rapidly than the polymeric wall of the processing chamber. (*See e.g.*, Specification, 17:4-9) The surface of the microfeature workpiece is then etched with the etchant liquid at or above the second temperature. (*See e.g.*, Specification, 17:10-14)

C. Claim 19

In another embodiment, as set forth in claim 19, a method for processing a microfeature workpiece includes supporting a microfeature workpiece with an unheated support in an interior of a processing chamber having a polymeric wall. (*See e.g.*, Specification, 9:13-15) A surface of the

microfeature workpiece is in contact with a processing fluid. (*See e.g.*, Specification, 8:8-10) Infrared radiation is delivered through the polymeric wall of the processing chamber to heat the processing fluid from a first temperature to a higher second temperature that promotes processing of the surface of the microfeature workpiece. (*See e.g.*, Specification, 6:13-17) The polymeric wall is more infrared transparent than the processing fluid, so the processing fluid is heated more rapidly than the polymeric wall. (*See e.g.*, Specification, 8:2-10 and 11:17-27) The temperature of the processing fluid is maintained at or above the second temperature for a process period to process the surface of the microfeature workpiece. During the process period, the temperature of the wall of the processing chamber is no greater than the temperature of the processing fluid. (*See e.g.*, Specification, 17:4-9)

D. Claim 49

In another embodiment, as set forth in claim 49, a method for processing a microfeature workpiece includes supporting a microfeature workpiece with an unheated support in an interior of a processing chamber having a polymeric wall and contacting a surface of the microfeature workpiece with a processing fluid. (*See e.g.*, Specification, 9:13-15) Infrared radiation is delivered through the polymeric wall of the processing chamber to heat the processing fluid from a first temperature to a higher second temperature that promotes processing of the surface of the microfeature workpiece. (*See e.g.*, Specification, 6:13-17) The polymeric wall is more infrared transparent than the processing fluid, so the processing fluid is heated more rapidly than the polymeric wall. (*See e.g.*, Specification, 8:2-10 and 11:17-27) The temperature of the processing fluid is maintained at or above the second temperature for a process period to process the surface of the microfeature workpiece. During the process period, the temperature of the wall of the processing chamber being no greater than the temperature of the processing fluid. (*See e.g.*, Specification, 17:4-9)

Several embodiments of the present invention can thus efficiently heat the etchant liquid without overheating the wall, the base, or the cover of the processing chamber because the components are substantially transparent to the radiation from the radiation source. (*See e.g.*, Specification, 8:4-8) As a result, several embodiments of the present invention can also allow the

processing chamber to be formed from materials that would not remain structurally stable if an external conduction heater is used. (*See e.g.*, Specification, 17:19-22)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1-9, 11-17, 19-27, and 49-56 were rejected under 35 U.S.C. § 103(a) over the combination of U.S. Patent No. 6,054,373 to Tomita et al. ("Tomita") and U.S. Patent No. 5,762,755 to McNeilly et al. ("McNeilly").

2. Claims 10, 18, and 28 were rejected under 35 U.S.C. § 103(a) over Tomita and U.S. Patent No. 6,399,517 to Yokomizo et al. ("Yokomizo").

VII. ARGUMENT

A. Section 103 Rejection of Claims 1-9, 11-17, 19-27, and 49-56

Claims 1-9, 11-17, 19-27, and 49-56 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Tomita and McNeilly. "[T]he examiner bears the initial burden of presenting a *prima facie* case of obviousness." *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d, 1955, 1956 (Fed. Cir. 1993). To establish a *prima facie* case of obviousness, the Examiner needs to determine the scope and content of the prior art, ascertain differences between the prior art and the claims at issue, and resolve the level of ordinary skill in the pertinent art. *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). The Examiner must then articulate, *inter alia*, a finding that one of ordinary skilled in the art could have substituted one known element for another, and the results of the substitution would have been predictable. 72 Fed. Reg. 57526, 57,530 (Oct. 10, 2007). As set forth in detail below, the Examiner has failed to satisfy the burden of presenting a *prima facie* case of obviousness because (1) one of ordinary skill in the art would not modify Tomita's technique as suggested by the Examiner because, among other reasons, Tomita teaches away from combining with McNeilly; and (2) even if combined, the combined teachings of Tomita and McNeilly still do not teach or suggest all the limitations of the pending claims.

Grouping of Claims

Appellant believes that claims 1-9, 11-17, 19-27, and 49-56 include three separately patentable groups. More specifically, claims 1-9, 11-17, 19-27, and 49-56 do not stand or fall together with respect to the rejection under 35 U.S.C. § 103(a), but instead are grouped together as follows:

Group I:	Claims 1-5, 8, 9, 11-13, 16, and 17
Group II:	Claims 6, 7, 14, 15, and 19-27
Group III:	Claims 49-56

Group I consists of claims 1-5, 8, 9, 11-13, 16, and 17. Claims 1-5, 8, 9, 11-13, 16, and 17 recite a method for processing a microfeature workpiece by heating an etchant liquid with radiation through a polymeric wall that is more transmissive of an operative wavelength range of the radiation than the etchant liquid. As claims 1-5, 8, 9, 11-13, 16, and 17 recite a method distinctive from other method claims, Group I properly states a separately patentable claim group.

Group II consists of claims 6, 7, 14, 15, and 19-27. Claims 6, 7, 14, 15, and 19-27 recite a method for processing a microfeature workpiece by maintaining a temperature of a polymeric wall of the processing chamber to be no greater than the temperature of the etchant liquid. As claims 6, 7, 14, 15, and 19-27 recite a method distinctive from the other method claims, Group II properly states a separately patentable claim group.

Group III consists of claims 49-56. Claims 49-56 recite a method for processing a microfeature workpiece by increasing a temperature of an etchant liquid more rapidly than a temperature of a polymeric wall. As claims 49-56 recite a method distinctive from the other method claims, Group III properly states a separately patentable claim group.

Patentability of Group I – Claims 1-5, 8, 9, 11-13, 16, and 17

Claim 1 is directed to a method of processing a microfeature workpiece. The method includes supporting a microfeature workpiece by an unheated support in an interior of a processing chamber having a polymeric wall and contacting a surface of the microfeature workpiece with an

etchant liquid. The polymeric wall of the processing chamber is substantially non-reactive with the etchant liquid. The method also includes heating the etchant liquid by delivering radiation from a radiation source through the wall of the processing chamber to heat the etchant liquid. The polymeric wall is more transmissive of an operative wavelength range of the radiation than the etchant liquid; thereby a temperature of the etchant liquid is increased more rapidly than a temperature of the polymeric wall. The method further includes controlling the radiation source to maintain a temperature of the etchant liquid at or above a target process temperature to etch the surface of the microfeature workpiece and removing the etched microfeature workpiece from the processing chamber.

Tomita discloses an apparatus for removing metallic impurities diffused in a semiconductor substrate by causing the impurities to dissolve in a chemical agent outside the substrate. (column 1, lines 49-54) As shown in Tomita's Figure 5 (reproduced below), the apparatus can include a quartz beaker 21, a quartz holder 22 for holding a silicon substrate 23 in the quartz beaker 21, a chemical agent in the quartz beaker 21, and an external infrared heater 24 for heating the silicon substrate 23. In operation, the infrared heater 24 heats the inside of the substrate 23 to a treatment temperature to dissolve impurities from the substrate 23.

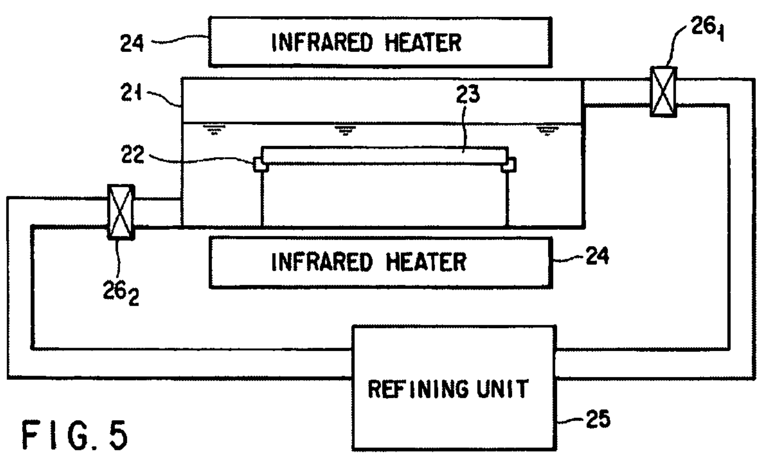


FIG. 5

As illustrated in Tomita's Figure 3 (reproduced below), a higher treatment temperature produces greater cleaning effects than a lower treatment temperature. (column 6, lines 38-40)

Accordingly, to sufficiently remove metallic impurities, Tomita discloses that the treatment temperature should be as high as possible (e.g., at least 200°C) but only lower than the boiling point of the chemical agent to remain in the liquid phase. (column 7, lines 33-36) For example, if sulfuric acid is used as the chemical agent, the treatment temperature should be about 290°C to 350°C. (column 5, lines 62-64)

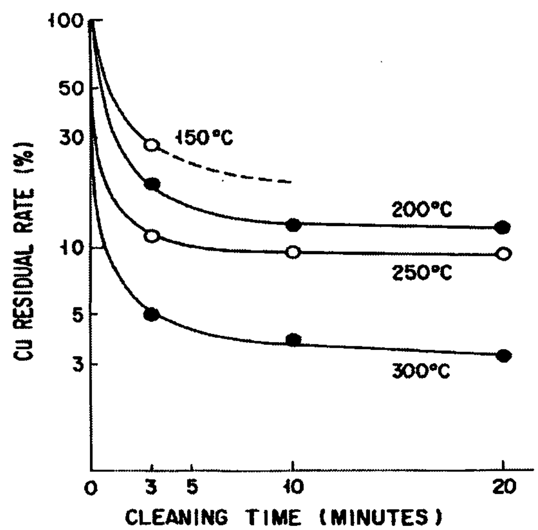
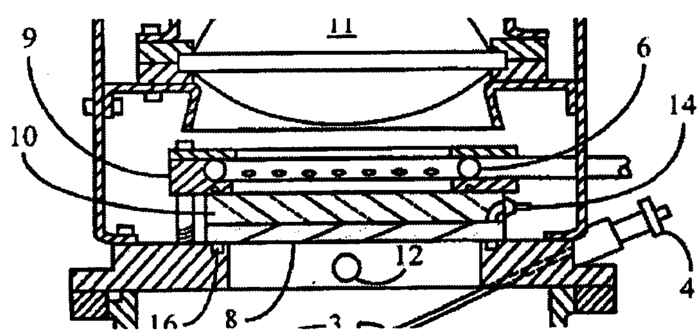


FIG. 3

McNeilly discloses a method for achieving greater uniformity and control in vapor phase etching of silicon (Abstract). In Figure 1 (partially reproduced below), McNeilly discloses an apparatus 1 that has a window assembly 9 with an upper window 10 made from fused quartz and a lower window 8. (column 12, lines 54-60)



The two-window assembly is used to assure strength and to allow the lower window 8 to be formed from a corrosion resistant material such as Teflon® FEP (column 12, lines 40-42).

One of ordinary skill in the art would not modify Tomita's cleaning apparatus as suggested by the Examiner because, among other reasons, modifying Tomita's beaker to be constructed with McNeilly's polymeric material would likely render Tomita's process unsatisfactory for its intended purpose. Tomita discloses etching a silicon substrate at a temperature of at least 200°C and as high as possible. (Tomita at column 7, lines 33-36). In one example, the highest treatment temperature can be about 290°C to 350°C when sulfuric acid is used. (Tomita at column 5, lines 62-65). If McNeilly's polymeric material (e.g., Teflon® AF and FEP) is used to form Tomita's beaker, Tomita's etching temperature could not be as high as just below the boiling point of the liquid because the service temperature of McNeilly's polymeric material restricts operating temperature of Tomita's beaker. For example, continuous exposure of FEP to temperatures above 200°C is not recommended according to Perry's Chemical Engineers' Handbook, 5th Edition, at 23-51 (Robert H. Perry ed., 1984). Even assuming that the etchant is at a higher temperature than the beaker walls, the FEP walls can still prevent Tomita's etching temperature from being "as high as possible" because at least the inside surface of the walls must contact the heated etchant. As a result, one skilled in the art would not use a beaker with polymeric walls when Tomita teaches that the etching temperature should be as high as possible to sufficiently and effectively remove metallic impurities from a silicon substrate.

Further, one skilled in the art would not modify Tomita's teachings such that Tomita's "beaker walls could [be polymeric and] possibly be cooled from the outside of the beaker with a cooled air flow ..., or the heating action is provided in a pulse short enough to allow heating of the substrate/etchant interface without heating the container walls," as suggested by the Examiner (Office Action, October 17, 2006, page 17). Tomita's beaker is made of quartz for the very purpose of withstanding high treatment temperatures. As a result, Tomita attempts to avoid external cooling for Tomita's process because the beaker already can handle the high etching temperatures. Thus, adding external cooling only adds cost and complexity to Tomita's process for apparently no benefit.

Moreover, one of ordinary skill in the art would not modify Tomita's apparatus according to McNeilly's teachings because the operating environment of Tomita is different than that of McNeilly. Tomita discloses a liquid etching apparatus that contains a liquid, such as concentrated sulfuric acid. McNeilly, on the other hand, discloses a vapor etching apparatus that contains only a vapor etchant. As one skilled in the art recognizes, the corrosion resistance and structural strength characteristics of materials can vary widely when contacting a liquid instead of a vapor. For example, a material resistant to a gas might not be resistant to a liquid of the same substance. As a result, there is no reasonable expectation of success to replace a component in a liquid etching apparatus with a component from a vapor etching apparatus.

Finally, even if Tomita and McNeilly were to be combined, the combined teachings do not teach or suggest all the claim limitations of claim 1. As discussed above, Tomita discloses a quartz beaker, and McNeilly discloses a window assembly that includes a polymeric lower window and a quartz upper window. McNeilly, at most, teaches using quarts <u>with</u> a polymeric window; it does not teach using a polymeric material alone. As a result, if the two references were to be combined, the resulting apparatus would be a quartz beaker having a window assembly that includes a polymeric lower window and a quartz upper window. Thus, without using the pending claims as a map, the Examiner would not have proposed modifying Tomita's cleaning apparatus according to McNeilly's teachings to come up with the arrangement of claim 1.

Accordingly, the current rejection of claim 1 does not comply with Section 103(a) because (1) one of ordinary skill in the art would not modify Tomita's apparatus as suggested by the Examiner; and (2) the combined teachings of Tomita and McNeilly do not teach or suggest all the limitations of the pending claims. Therefore, the Section 103(a) rejection of claim 1 is improper and should be reversed. Claim 11 includes subject matter generally analogous to that of claim 1. As a result, the Section 103(a) rejection of claim 11 should also be reversed. Claims 2-5, 8, 9, 12, 13, 16, and 17 depend from claims 1 or 11. Accordingly, the Section 103(a) rejection of claims 2-5, 8, 9, 12, 13, 16, and 17 is improper and should be reversed for at least the reasons discussed above with reference to claim 1 and for the additional features of these claims.

Patentability of Group II – Claims 6, 7, 14, 15, and 19-27

Claim 6 depends from claim 1 and includes the additional feature "wherein a temperature of the wall of the processing chamber is no greater than the temperature of the etchant liquid when the etchant liquid is at or above the target process temperature."

One of ordinary skill in the art would not modify Tomita's system as suggested by the Examiner because Tomita teaches away from being modified to come up with the arrangement of this claim as described above with reference to Group I. Further, even if Tomita were to be combined with McNeilly, the combined teachings of these references still fail to disclose or suggest several features of claim 6. For example, in addition to the arguments discussed above with respect to Group I, neither Tomita nor McNeilly disclose that "a temperature of the wall of the processing chamber is no greater than the temperature of the etchant liquid when the etchant liquid is at or above the target process temperature." (emphasis added) Instead, Tomita discloses heating a silicon substrate to have an internal temperature of the substrate higher than the boiling point of the chemical agent while the surface temperature of the substrate is below the boiling point of the chemical agent. (Tomita at column 8, lines 3-9) McNeilly discloses a vapor etching system, so McNeilly's system does not even have a chemical agent below its boiling point during operation. As a result, the applied references do not teach or suggest all the claim limitations of claim 6, and the Examiner has not explained why the deficiencies of these references would have been obvious to one or ordinary skilled in the art.

Accordingly, the Section 103(a) rejection of claim 6 is improper and should be reversed for at least the reasons discussed above. Claims 14 and 19 include subject matter generally analogous to that of claim 6. As a result, the Section 103 rejection of these claims should also be reversed. Claims 7, 15, and 20-27 depend from claims 6, 14, or 19. Accordingly, the Section 103(a) rejection of claims 7, 15, and 20-27 is improper and should be reversed for at least the reasons discussed above with reference to claim 6 and for the additional features of these claims.

Patentability of Group II – Claims 49-56

Claim 49 is directed toward a method of processing a microfeature workpiece. The method includes supporting a microfeature workpiece in a processing chamber having a wall constructed from a polymeric material and contacting the microfeature workpiece with an etchant liquid. The polymeric wall of the processing chamber is substantially non-reactive with the etchant liquid. The method also includes increasing a temperature of the etchant liquid more rapidly than a temperature of the polymeric wall by delivering radiation to the etchant liquid from a radiation source and through the polymeric wall of the processing chamber and controlling the radiation source to maintain a temperature of the etchant liquid at or above a target process temperature to etch the microfeature workpiece.

One of ordinary skill in the art would not modify Tomita's system as suggested by the Examiner because Tomita teaches away from being modified to come up with the arrangement of this claim as described above with reference to Group I. Further, even if Tomita were to be combined with McNeilly, the combined teachings of these references still fail to disclose or suggest several features of claim 6. For example, in addition to the above discussion with respect to Group I, neither Tomita nor McNeilly disclose "increasing a temperature of the etchant liquid more rapidly than a temperature of the polymeric wall." (emphasis added) Instead, Tomita is mainly concerned with the values (e.g., 200°C) of the treatment temperature, not the rate of increase of the treatment temperature. McNeilly discloses a vapor etching system that does not include an etchant liquid. As a result, the applied references do not teach or suggest all the claim limitations of claim 49, and the Examiner has not explained why the deficiencies of these references would have been obvious to one or ordinary skilled in the art.

Accordingly, the Section 103(a) rejection of claim 49 is improper and should be reversed for at least the reasons discussed above. Claims 50-56 depend from claim 49. Accordingly, the Section 103(a) rejection of claims 50-56 is improper and should be reversed for at least the reasons discussed above with reference to claim 6 and for the additional features of these claims.

B. Section 103 Rejection of Claims 10, 20, and 28

Claims 10, 18, and 28 were rejected under 35 U.S.C. § 103(a) over the combination of Tomita and Yokomizo. Claim 10 depends from claim 1 and includes the additional feature of "wherein etching the surface of the microfeature workpiece yields a resultant etchant, the method further comprising determining at least one chemical property of the microfeature workpiece by chemically analyzing the resultant etchant."

One of ordinary skill in the art would not modify Tomita's system as suggested by the Examiner because Tomita teaches away from being modified to come up with the arrangement of this claim as described above with reference to Group I. Yokomizo fails to cure the deficiencies of Tomita. Specifically, Yokomizo does not disclose or suggest a processing chamber having a polymeric wall. Instead, Yokomizo discloses "a process bath 10 that includes an inner bath 11 made of quartz to store the etching liquid E and an outer bath 12 also made of quartz to receive the etching liquid E." Accordingly, the Section 103(a) rejection of claim 10 is improper and should be reversed for at least the reasons discussed above. Claims 18 and 28 include subject matter generally analogous to that of claim 10. As a result, the Section 103 rejection of these claims should also be reversed for at least the reasons discussed above with reference to claim 10 and for the additional features of these claims.

VIII. CLAIMS APPENDIX

A copy of the claims involved in the present appeal is attached hereto as Claims Appendix.

IX. EVIDENCE APPENDIX

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the Examiner is being submitted.

X. RELATED PROCEEDINGS APPENDIX

No related proceedings are referenced in II. above, or copies of decisions in related proceedings are not provided, hence no Appendix is included.

Respectfully submitted,

Perkins Coie LLP

Date: 3/30/08

Chen Liang
Registration No. 51,945

Correspondence Address:
Customer No. 25096
Perkins Coie LLP
P.O. Box 1247
Seattle, Washington 98111-1247
(206) 359-8000

XI. CLAIMS APPENDIX

1. (Previously Presented) A method of processing a microfeature workpiece, comprising:

supporting a microfeature workpiece by an unheated support in an interior of a processing chamber having a polymeric wall;

contacting a surface of the microfeature workpiece with an etchant liquid, the polymeric wall of the processing chamber being substantially non-reactive with the etchant liquid;

heating the etchant liquid by delivering radiation from a radiation source through the polymeric wall of the processing chamber to heat the etchant liquid, the polymeric wall being more transmissive of an operative wavelength range of the radiation than the etchant liquid, thereby a temperature of the etchant liquid is increased more rapidly than a temperature of the polymeric wall;

controlling the radiation source to maintain a temperature of the etchant liquid at or above a target process temperature to etch the surface of the microfeature workpiece; and

removing the etched microfeature workpiece from the processing chamber.

2. (Original) The method of claim 1 further comprising adding the etchant liquid to the processing space at a first temperature that is below the target process temperature.

3. (Original) The method of claim 1 wherein the radiation is delivered substantially uniformly across the surface of the microfeature workpiece.

4. (Original) The method of claim 1 wherein the radiation comprises infrared radiation.

5. (Original) The method of claim 1 further comprising enclosing the microfeature workpiece within the interior of the processing chamber.

6. (Original) The method of claim 1 wherein a temperature of the wall of the processing chamber is no greater than the temperature of the etchant liquid when the etchant liquid is at or above the target process temperature.

7. (Original) The method of claim 6 wherein the processing chamber includes a base, a temperature of the base of the processing chamber being no greater than the temperature of the etchant liquid when the etchant liquid is at or above the target process temperature.

8. (Original) The method of claim 1 wherein the radiation is substantially the only heat source for heating the etchant liquid from a first temperature to the target process temperature, which is higher than the first temperature.

9. (Original) The method of claim 1 wherein an inner surface of the processing chamber comprises a fluoropolymer, further comprising contacting the inner surface of the processing chamber with the etchant liquid.

10. (Original) The method of claim 1 wherein etching the surface of the microfeature workpiece yields a resultant etchant, the method further comprising determining at least one chemical property of the microfeature workpiece by chemically analyzing the resultant etchant.

11. (Previously Presented) A method of processing a microfeature workpiece comprising:

positioning a microfeature workpiece on an unheated support in an interior of a processing chamber, the processing chamber having a polymeric wall with an inner surface;

enclosing the microfeature workpiece within the interior of the processing chamber;

contacting a surface of the microfeature workpiece with an etchant liquid at a first temperature, the etchant liquid being substantially non-reactive with the inner surface of the processing chamber;

heating the etchant liquid from the first temperature to a second temperature using an infrared heat source positioned entirely outside the enclosed processing chamber and through the polymeric wall, the second temperature being higher than the first temperature and the second temperature promoting etching of a surface of the microfeature workpiece, the etchant liquid being more absorptive of radiation from the infrared heat source than the polymeric wall, thereby the etchant liquid is heated more rapidly than the polymeric wall of the processing chamber; and

etching the surface of the microfeature workpiece with the etchant liquid at or above the second temperature.

12. (Original) The method of claim 11 wherein the radiation is delivered substantially uniformly across the surface of the microfeature workpiece.

13. (Original) The method of claim 11 wherein the infrared radiation comprises near infrared radiation.

14. (Original) The method of claim 11 wherein a temperature of the wall of the processing chamber is no greater than the temperature of the etchant liquid when the etchant liquid is at or above the second temperature.

15. (Original) The method of claim 14 wherein the processing chamber includes a base, a temperature of the base of the processing chamber being no greater than the temperature of the etchant liquid when the etchant liquid is at or above the second temperature.

16. (Original) The method of claim 11 wherein the infrared radiation is substantially the only heat source for heating the etchant liquid from the first temperature to the second temperature.

17. (Original) The method of claim 11 wherein the inner surface of the processing chamber comprises a fluoropolymer, further comprising contacting the inner surface of the processing chamber with the etchant liquid.

18. (Original) The method of claim 11 wherein etching the surface of the microfeature workpiece yields a resultant etchant, the method further comprising determining at least one chemical property of the microfeature workpiece by chemically analyzing the resultant etchant.

19. (Previously Presented) A method of processing a microfeature workpiece, comprising:

supporting a microfeature workpiece with an unheated support in an interior of a processing chamber having a polymeric wall;

contacting a surface of the microfeature workpiece with a processing fluid;

delivering infrared radiation through the polymeric wall of the processing chamber to heat the processing fluid from a first temperature to a higher second temperature that promotes processing of the surface of the microfeature workpiece, the polymeric wall being more infrared transparent than the processing fluid, thereby the processing fluid is heated more rapidly than the polymeric wall; and

maintaining a temperature of the processing fluid at or above the second temperature for a process period to process the surface of the microfeature workpiece, a temperature of the wall of the processing chamber being no greater than the temperature of the processing fluid during the process period.

20. (Original) The method of claim 19 wherein the processing fluid comprises an etchant liquid and processing the surface of the microfeature workpiece comprises etching the surface of the microfeature workpiece.

21. (Original) The method of claim 19 wherein an inner surface of the processing chamber comprises a fluoropolymer and the processing fluid comprises an etchant liquid, further comprising contacting the inner surface of the processing chamber with the etchant liquid.

22. (Original) The method of claim 19 further comprising adding the processing fluid to the processing space at an introduction temperature that is below the second temperature.

23. (Original) The method of claim 19 further comprising adding the processing fluid to the processing space at the first temperature that is below the second temperature.

24. (Original) The method of claim 19 wherein the radiation is delivered substantially uniformly across the surface of the microfeature workpiece.

25. (Original) The method of claim 19 wherein the radiation comprises infrared radiation.

26. (Original) The method of claim 19 further comprising enclosing the microfeature workpiece within the interior of the processing chamber.

27. (Original) The method of claim 19 wherein the radiation is substantially the only heat source for heating the processing fluid from the first temperature to the second temperature.

28. (Original) The method of claim 19 wherein processing the surface of the microfeature workpiece yields a resultant fluid, the method further comprising determining at least one chemical property of the microfeature workpiece by chemically analyzing the resultant fluid.

29-48. (Canceled)

49. (Previously presented) A method of processing a microfeature workpiece, comprising:

supporting a microfeature workpiece in a processing chamber having a wall constructed from a polymeric material;

contacting the microfeature workpiece with an etchant liquid, the polymeric wall of the processing chamber being substantially non-reactive with the etchant liquid;

increasing a temperature of the etchant liquid more rapidly than a temperature of the polymeric wall by delivering radiation to the etchant liquid from a radiation source and through the polymeric wall of the processing chamber; and

controlling the radiation source to maintain a temperature of the etchant liquid at or above a target process temperature to etch the microfeature workpiece.

50. (Previously presented) The method of claim 49 wherein the etchant liquid absorbs more the delivered radiation than the polymeric wall.

51. (Previously presented) The method of claim 49 wherein the radiation is delivered substantially uniformly across a surface of the microfeature workpiece.

52. (Previously presented) The method of claim 49 wherein the radiation comprises infrared radiation.

53. (Previously presented) The method of claim 49 further comprising enclosing the microfeature workpiece within an interior of the processing chamber.

54. (Previously presented) The method of claim 49 further comprising raising the temperature of the etchant liquid to or above the target process temperature while a temperature of the polymeric wall of the processing chamber is lower than the target process temperature.

55. (Previously presented) The method of claim 54 wherein the processing chamber includes a base constructed from the polymeric material, a temperature of the base of the processing chamber being no greater than the temperature of the etchant liquid when the etchant liquid is at or above the target process temperature.

56. (Previously presented) The method of claim 49 wherein etching the surface of the microfeature workpiece yields a resultant etchant, the method further comprising determining at least one chemical property of the microfeature workpiece by chemically analyzing the resultant etchant.

XII. EVIDENCE APPENDIX

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

XIII. RELATED PROCEEDINGS APPENDIX

No related proceedings are referenced in Section II above, hence copies of decisions in related proceedings are not provided.